PP7MX PRINTER COMMAND MANUAL

Pinnacle Technology Corp.

CONTENTS

1 COMMANDS

The command explanations include the following parts:

1） **Name and the general description of the command's function**---This is the first part for the command description; it presents the command's ASCII code format and general description of its function.

2） **Format**---This part used ASCII coding form, decimal code, and hex code to describe the command.

3） **(Parameter) Range**---This part gives the range of the variable. If there is special explanation, it should be the decimal value. E.g. $1 \le n \le 4$，in which the number '1' is the decimal value, but the ASCII coding form.

4） **Description**---This part is to explain the command in detail.

5） **Note**---This part gives the attention items of the command. As the commands may interfere with each other when they are used in different modes or when they co-work with different commands, yet this part gives the details for these attention items.

	Command	Decimal	Hex	Function
1	HT	9	9	Horizontal tab
2	LF	10	0A	Print and line feed
3	FF	12	0C	Print and recover to page mode
4	CR	13	0D	Print and carriage return
5	DLE EOT	16 4	10 04	Transmit real-time state
6	CAN	24	18	Cancel print data in page mode
7	ESC FF	27 12	1B 0C	Print data in page mode
8	ESC SP	27 32	1B 20	Set right-side character spacing
9	ESC !	27 33	1B 21	Select print mode(s)
10	ESC $	27 36	1B 24	Set absolute print position
11	ESC *	27 42	1B 2A	Select bit-image mode
12	ESC -	27 45	1B 2D	Turn underline mode on/off
13	ESC 2	27 50	1B 32	Select default line spacing
14	ESC 3	27 51	1B 33	Set line spacing
15	ESC =	27 61	1B 3D	Select printer or VFD
16	ESC @	27 64	1B 40	Initialize printer
17	ESC D	27 68	1B 44	Set horizontal tab positions
18	ESC J	27 74	1B 4A	Print bitmap lattice data, and feed n lines
19	ESC L	27 76	1B 4C	Select page mode
20	ESC S	27 83	1B 53	Select standard mode
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22	ESC W	27 87	1B 57	Set printing area in page mode
23	ESC \	27 92	1B 5C	Specify relative position
24	ESC a	27 97	1B 61	Position alignment
25	ESC d	27 100	1B 64	Print and feed paper n lines

	Command		Decimal		Hex		Function
26	ESC	i	27	105	1B	69	Execute partial-cut
27	ESC	p	27	112	1B	70	Specify cash drawer pulse
28	ESC	t	27	116	1B	74	Select character code table
29	ESC	v	27	118	1B	76	Transmit paper sensor status
30	ESC	{	27	123	1B	7B	Turn upside-down printing mode on/off
31	FS	!	28	33	1C	21	Set Chinese characters mode
32	FS	S	28	83	1C	53	Set Chinese character space amount
33	FS	p	28	112	1C	70	Print bit image that download to flash
34	FS	q	28	113	1C	71	Define NV bit image
35	GS	!	29	33	1D	21	Select character size
36	GS	$	29	36	1D	24	Specify absolute position for character vertical direction in page mode
37	GS	H	29	72	1D	48	Select printing position of HRI characters
38	GS	L	29	76	1D	4C	Set left margin
39	GS	P	29	80	1D	50	Set basic calculated pitch
40	GS	V	29	86	1D	56	Select paper-cut mode and cut paper
41	GS	\	29	92	1D	5C	Specify relative position for character vertical direction in page mode
42	GS	h	29	104	1D	68	Set bar code height
43	GS	k	29	107	1D	6B	Print bar code
44	GS	v	29	118	1D	76	Print raster bitmap
45	GS	w	29	119	1D	77	Set bar code width

(1)

● **HT   Horizontal tab**

Format: ASCII   HT

Decimal   9

Hex   09

Description: Moves the print position to the next horizontal tab position.

Notes:

● This command is ignored unless the next horizontal tab position has been set.

● If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [printing area width + 1].

● Horizontal tab positions are set with ESC D.

● If this command is received when the printing position is at [printing area width + 1], the printer executes print bufferfull printing of the current line and horizontal tab processing from the beginning of the next line.

Reference : ESC D

(2)

● **LF**   Print and line feed

Format:	ASCII	LF
	Decimal	10
	Hex	0A

Note:

- LF prints the data in the print buffer and fed per line based on the current line space.
- Print characters with CR command.

(3)

● **FF**   Print and recover to page mode

Format:	ASCII	FF
	Decimal	12
	Hex	0C

Description: Prints all buffered data to the print region collectively, then recovers to the standard mode.

Note:

- All buffer data is deleted after printing.
- The print area set by ESC W (Set print region in page mode) is reset to the default setting.
- No paper cut is executed.
- Sets the print position to the beginning of the next line after execution.
- This command is enabled only in page mode.

Reference: ESC FF, ESC L, ESC S

(4)

● **CR**   Print and carriage return

Format:	ASCII	CR
	Decimal	13
	Hex	0D

Note:

- Set the print position to the beginning of the line.
- Print characters with LF command.

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● DLE EOT n   Transmit real-time state

Format:	ASCII	DLE	EOT	n
	Decimal	16	4	n
	Hex	10	04	n

Range: 1≤n≤4

Note:

- This command is only suitable for the printer model of serial port.
- Transmit the real-time state parameter n of the printer, in order to designate the deferent printer state, define as follows:

n=1: transmit printer state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Cash drawer open
	On	04	4	Cash drawer closed
3	Off	00	0	Online
	On	08	8	Offline
4	On	10	16	Fixed to On
5	Off	00	00	Not wait for online resume
	On	20	32	Wait for online resume
6	—	—	—	Undefined
7	Off	00	00	Fixed to Off

n=2: transmit offline state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Upper cover closed
	On	04	4	Upper cover open
3	Off	00	0	Not press paper feed key
	On	08	8	Press paper feed key
4	On	10	16	Fixed to On
5	Off	00	00	Paper adequate
	On	20	32	Printer no paper
6	Off	00	0	No error
	On	40	64	Error
7	Off	00	0	Fixed to Off

n=3: transmit error state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2		—	—	Undefined
3	Off	00	0	Cut no error
	On	08	8	Cut error
4	On	10	16	Fixed to On
5	Off	00	0	No beyond retrieve error
	On	20	32	Beyond retrieve error
6	Off	00	0	Printer temperature and voltage normal
	On	40	64	Printer temperature or voltage over range
7	Off	00	0	Fixed to Off

n=4: transmit paper roll sensor state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2, 3	Off	00	0	Paper adequate
	On	0C	12	Paper near end
4	On	10	16	Fixed to On
5,6	Off	00	00	Paper adequate
	On	60	96	Paper end
7	Off	00	0	Fixed to Off

(6)

● **CAN**　　　　Cancel

　　Format:　　ASCII　　CAN
　　　　　　　　Decimal　　24
　　　　　　　　Hex　　　　18

　Description:　Deletes all print data in the currently set print region in page mode.

　Note: .

- This command is enabled only in page mode.
- Portions included in the currently set print region are also deleted, even if previously set print region data.

　Reference: ESC L, ESC W

(7)

● **ESC FF**　　print data in page mode

　　Format:　　ASCⅡ　　ESC　　FF
　　　　　　　　Decimal　　27　　12
　　　　　　　　Hex　　　　1B　　0C

　Description:　Prints all buffered data in the print area collectively in page mode.

　Note:

- This command is enabled only in page mode.
- Holds the following information after printing.
    a. Expanded data
    b. Character print direction selection in page mode (ESCT)
    c. Set print region (ESCW) in the page mode.
    d. Character expansion position

　Reference: FF, ESCL, ESCS

(8)

● **ESC SP n**　　Set right-side character spacing

　　Format:　　ASCII　　ESC　SP　　n
　　　　　　　　Decimal　　27　32　　n
　　　　　　　　Hex　　　　1B　20　　n

　Range:　　$0 \leqslant n \leqslant 255$

　Initial Value:　n=0

　Function:　　Set the right space amount for the character to [n $\times$ basic calculated pitch].

Details:

- If the character horizontal direction magnification ratio is more than 2, the right space amount is also enlarged accordingly.
- This command does not affect Chinese characters.
- Right space amounts can be set independently for both the standard and page modes.
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the right space amount, it is not affected even if the basic calculated pitch is changed.
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (x) for the horizontal direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.
  a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
  b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- The maximum value that can be set for the right space amount is approximately 35.983 mm (or 255/180 inch). Specifications that exceed the maximum value are rounded off to that value.

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- **ESC ！** **Select print modes**

  Format:　ASCⅡ　　ESC　　　！　　n
  　　　　　Decimal　　27　　33　　　n
  　　　　　Hex　　　　1B　　21　　　n

  Range　　0≤n≤255

  Initial Value　n=0

  Function　Select print mode(s) using n as follows.

Bit	Off/On	1/0	Hex	Decimal	Functions
0	Off	0	00	0	Character font A(12×24) selected
1，2	Off		---	---	Reserved
3	Off	0	00	0	Emphasized mode not selected.
	On	1	08	8	Emphasized mode selected.
4	Off	0	00	0	Double-height mode not selected.
	On	1	10	16	Double-height mode selected.
5	Off	0	00	0	Double-width mode not selected.
	On	1	20	32	Double-width mode selected.
6	Off		---	---	Reserved
7	Off	0	00	0	Underline mode not selected.
	On	1	80	128	Underline mode selected.

Details:

- Quadruple-size characters are printed by specifying both double-tall (bit4=1) and double-wide (bit 5=1) modes.
- An underline is applied to the entire character width, including the ESC SP (character right space amount). However, underlines are not applied to portions that have been skipped using HT (horizontal tab) or ESC V (character 90 degree rotation).
- The thickness of the underline is set by ESC - (specify/cancel underlines) regardless of the character.
- The base line for characters is the same when there are characters having different vertical direction ratios in

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the same line.
- The setting of the last received command is effective even when emphasized printing is executed by the ESC E (specify/cancel emphasized printing) command.
- The setting of the last received command is effective even when underlines are executed by the (ESC -) Specify/cancel underline command.
- The setting of the last received command is effective even when character size is executed by the GS! command.
- Emphasized printing (bit 3) is effective for ANK and Chinese characters. Other printing modes are effective only on ANK characters. Specifications using this command are ignored in HRI characters.
  The following are the font configurations on printers.

Reference: ESC-, ESC E, GS!

(10)
- **ESC $**   Set absolute print position

Format:	ASCⅡ	ESC	$	nL	nH
	Decimal	27	36	nL	nH
	Hex	1B	24	nL	nH

Range: $0 \leq nL \leq 255$
          $0 \leq nH \leq 255$

Description:

Specifies the next printing starting position using an absolute position based on the left margin position. The next printing starting position is the position specified by [(nL+nH$\times$256) $\times$ basic calculated pitch] from the left margin position.

Note:
- Specifications exceeding the print range are ignored.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (x) for the horizontal direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.
  a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
  b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.

Reference: ESC \ , GS $, GS \ , GS P

(11)
- ESC *   Select bit-image mode

Format:	ASCII	ESC	*	m	nL	nH	d1 ... dk
	Decimal	27	42	m	nL	nH	d1 ... dk
	Hex	1B	2A	m	nL	nH	d1 ... dk

Range: m=0, 1, 32, 33
       $0 \leq nL \leq 255$
       $0 \leq nH \leq 3$
       $0 \leq d \leq 255$

ESC * m nL nH d1 ... dk selects a bit-image mode using m for the number of dots specified by (nL +

nH×256). Set a bit to 1 to print a dot, or set a bit to 0 to not print a dot. d indicates the bit image data. The modes selectable by m are as follows:

m	Mode	Vertical direction		Horizontal direction	
		Number of bits for vertical data	Dot density (DPI)	Dot density (DPI)	Amount of data (k)
0	8-dot single-density	8	68	101	192
1	8-dot double-density	8	68	203	384
2	24-dot single-density	24	203	101	192
33	24-dot double-density	24	203	203	384
39	24-dot double-density	24	203DPI	203DPI	384

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● ESC -   Turn underline mode on/off

Format: ASCⅡ   ESC   -   n

Decimal   27   45   n

Hex   1B   2D   n

Range: 0≤n≤1

0: turn underline mode off

1: turn underline mode on

(13)

● ESC 2   Select default line spacing

Format: ASCⅡ   ESC   2

Decimal   27   50

Hex   1B   32

Description: Sets line feed amount per one line to approximately 4.23 mm (1/6 inch).

Note: Line spacing can be set independently for both the standard and page modes.

Reference: ESC 3

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● ESC 3   Set line spacing

Format: ASCⅡ   ESC   3   n

Decimal   27   51   n

Hex   1B   33   n

Range: 0≤n≤255

Description: Sets the line space for one line to [n x basic calculated pitch].

Note:

● ESC 3 n sets the line spacing to n×(vertical or horizontal motion unit). The default setting of the paper feed amount is 1/6 inch (n=60). The maximum line spacing amount is 40 inches. When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print direction set by ESC T.

● The line spacing can be set independently in standard mode and in page mode.

● The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the line space, it is not affected even if the basic calculated pitch is changed.

● If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

- In standard mode, the basic calculated pitch (y) for the vertical direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.
  - a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
  - b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- The maximum value that can be set for the line space is approximately 1,016mm (or 40 inches). Specifications that exceed the maximum value are rounded off to that value.

Reference: ESC 2, GS P

(15)

- ESC = n   Select printer or VFD

Format:	ASCII	ESC	=	n
	Decimal	27	61	n
	Hex	1B	3D	n

Range: $1 \leqslant n \leqslant 2$

Function: Selects the printer or VFD for which the data is effective from the host computer.

Bit	1/0	Hex	Decimal	Function
0		-	-	Undefined
1	1	01	1	Printer valid
2	2	02	2	VFD valid
3-7		-	-	Undefined

The function of bit 0 and bit 3~7 are undefined.

Details: If the printer is selected to be invalid, the printer discards all data from the next data until the printer is made valid again by this command. (This excludes DLEEOT, DLEENQ, DLEDC4.)

Even when the printer is not invalid, the printer specification of this command (n = 1) is processed.

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- ESC   @   Initialize printer

Format:	ASCⅡ	ESC	@
	Decimal	27	64
	Hex	1B	40

ESC @ initializes the printer. All settings, including character font and line spacing settings, are canceled. The data in the print buffer is cleared and the printer mode is reset to the mode that was in effect when the power was turned on. The DIP switch settings are not checked again, the data in the receive buffer is not cleared, and any macro definitions are not cleared.

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- ESC   D   Set horizontal tab positions

Format:	ASCⅡ	ESC	D	n1 … nk NUL
	Decimal	27	68	n1 … nk 00
	Hex	1B	44	n1 … nk 0

Range: $1 \leqslant n \leqslant 255$
            $0 \leqslant k \leqslant 32$

Description:

ESC D n1 … nk NUL sets a horizontal tab position to n columns from the beginning of a line, with k

indication the total number of horizontal tab positions to be set. When a left margin is set in standard mode, the position of the left margin is the beginning of the line. A maximum of 32 tab positions can be set. This command cancels any previous horizontal tab settings. The default tab positions are every eight characters for the font A (12×24).

Note: The character width is stored for standard and page modes.

Reference: HT

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● **ESC J** Print and feed paper

Format:	ASCⅡ	ESC	J	n
	Decimal	27	74	n
	Hex	1B	4A	n

Range: 0≤n≤255

Description:

ESC J n prints the data in the print buffer and feeds the paper n×(vertical or horizontal motion unit). This command is used to temporarily feed a specific length without changing the line spacing set by other commands. The maximum paper feed amount is 40 inches. When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used fro the print direction set by ESC T.

Note:

● In standard mode, the basic calculated pitch (y) for the vertical direction is used.

● In page mode, the basic calculated pitch that is used according to the starting point varies.

    a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.

    b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.

● Paper is fed approximately 1016 mm if the [n x basic calculated pitch] exceeds approximately 1016mm (40 inches).

Reference: GS P

(19)

● ESC L Select page mode

Format:	ASCⅡ	ESC	L
	Decimal	27	76
	Hex	1B	4C

Description: Switches from standard mode to page mode.

Note:

● Enabled only when input with the top of line.

● Invalid when input by page mode.

● Returns to standard mode after the following commands are issued.

    a. FF (Print and recover to page mode)

    b. ESC S (Select standard mode)

● Character expansion position has the starting point specified by ESC T (Character print direction selection in page mode) in the printing region designated by the ESC W (Set print region in the page mode) command.

● This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for page mode.

a. Set space amount: ESC SP, FS S

b. Set line feed amount: ESC 2, ESC 3

- The following commands are enabled only when in page mode.

  a. ESC V :Specify/cancel character 90 degree clockwise rotation

  b. ESC a :Position alignment

  c. ESC { :Specify/cancel upside-down printing

  d. GS L :Set left margin

  e. GS W :Set print region width

- The following command is ignored in page mode.

  a. GS (A :Test print

- The following commands are invalid in page mode.

  a. FSp :Print NV bit image

  b. FSq :Define NV bit image

  c. FSg1 :Write data to user NV memory

  d. GSv0 :Print raster bit images

- Recover to standard mode using ESC@ (initialize printer).

Reference: FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS $, GS \

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- ESC   S   Select standard mode

Format:	ASCⅡ	ESC	FF
	Decimal	27	83
	Hex	1B	53

Description: Switches from page mode to standard mode.

Note:

- Valid only when input by page mode.
- All buffer data in page mode is deleted.
- Sets the print position to the beginning of the next line after execution.
- The print area set by ESCW (Set print region in page mode) is reset to the default setting.
- This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for standard mode

  a. ESC SP :Set character right space amount

  b. FS S :Set Chinese character space amount

  c. ESC 2 :Set default line spacing

  d. ESC 3 :Set line feed amount

- The following commands are effective only when in standard mode.

  a. ESC W :Set print region in page mode

  b. ESC T :Select character print direction in page mode

- The following commands are ignored in standard mode.

  a. GS S :Specify absolute position for character vertical direction in page mode

  b. GS \: :Specify relative position for character vertical direction in page mode

- Standard mode is selected when the power is turned on, the printer is reset or initialized (ESC @).

Reference: FF, ESC FF, ESC L

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● ESC T   Select character print direction in page mode

   Format: ASCⅡ   ESC   FF

                 Decimal   27   84

                 Hex   1B   54

Range: $0 \leq n \leq 3$, $48 \leq n \leq 51$

Initial Value: $n = 0$

Description: Selects the character printing direction and starting point in page mode.

n	Print Direction	Starting Point
0, 48	Left to Right	Upper Left (A in the figure below)
1,49	Bottom to Top	Lower Left (B in the figure below)
2,50	Right to Left	Lower Right (C in the figure below)
3,51	Top to Bottom	Upper Right (D in the figure below)
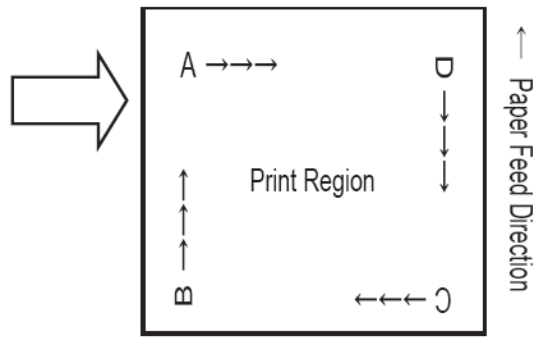
Note:

● Executes only a printer internal flag operation when this command is input in standard mode. The command does not affect printing in standard mode.

● The character expansion starting point is in the print region specified by ESC W (Set print region in page mode).

● The basic calculated pitch (x or y) used with the following commands differs according to the starting point.

  a. If the starting point is upper left or lower right (feeds paper and expands characters in the vertical direction)

    Commands using x :   ESC SP, ESC $, ESC \, FS S

    Commands using y :   ESC 3, ESC J, GS $, GS \

  b. If the starting point is upper right or lower left

    Commands using x :   ESC 3, ESC J, GS $, GS \

    Commands using y :   ESC SP, ESC $, ESC \, FS S

Reference: ESC $, ESC L, ESC W, ESC \, GS $, GS P, GS\

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● ESC W   Set printing area in page mode

    Format: ASCⅡ   ESC   W   xL xH yL yH dxL dxH dyL dyH

                 Decimal   27   87   xL xH yL yH dxL dxH dyL dyH

                 Hex   1B   57   xL xH yL yH dxL dxH dyL dyH

Range: $0 \leqslant$ xL, xH, yL, yH, dxL, dxH, dyL, dyH $\leqslant 255$ (except for dxL = dxH = 0 or dyL= dyH =0)
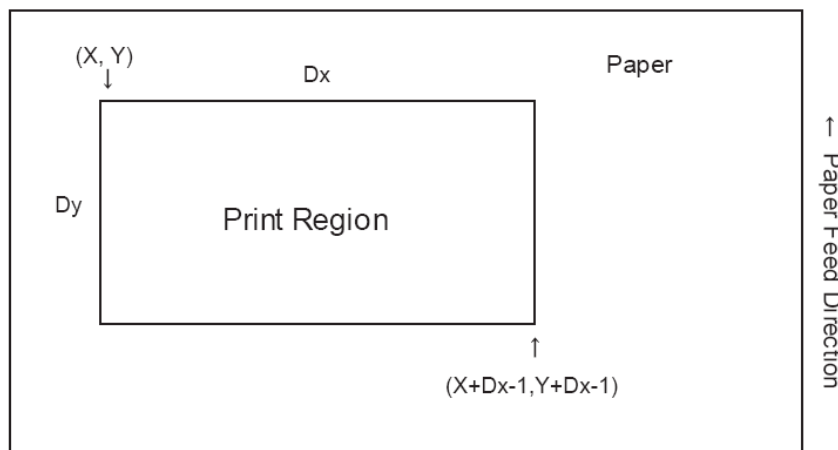
Description:

✧ ESC W xL   xH   yL   yH   dxL   dxH   dyL   dyH sets the size and position of the printing area in

page mode as follows:

    ∗ Horizontal starting position = (xL + xH×256) (horizontal motion unit)

    ∗ Vertical starting position = (yL + yH×256) (vertical motion unit)

    ∗ Printing area width = (dxL + dxH×256) (horizontal motion unit)

    ∗ Printing area height = (dyL + dyH×256) (vertical motion unit)

◇ The default settings are as follows:

    ∗ xL = 0, xH = 0, yL = 0, yH = 0

    ∗ dxL = 0, dxH = 2, dyL = 126, dyH = 6

◇ This command is enabled only in page mode. If this command is processed in standard mode, an internal flag is activated and this command is enabled when the printer selects page mode.

◇ The horizontal and vertical motion units use the horizontal and vertical values set by the GS P command. The default settings of the horizontal and vertical motion units are 1/180 and 1/360 inches, respectively.

Note:

● In standard mode, the printer executes only internal flag operations with this command is input.

● If the horizontal direction starting point or vertical direction starting point is outside of the printable region, the command is stopped and normal printing commences from subsequent data.

● If the horizontal direction length or vertical direction length is 0, the command is stopped and normal printing commences from subsequent data.

● The character expansion starting point is the point specified by selecting the character printing direction (ESC T) in page mode in the print region.

● If (horizontal direction starting position + horizontal direction length) exceeds the printable region in the horizontal direction, the horizontal direction length is set to (horizontal direction printable region - horizontal direction starting point).

● If (vertical direction starting position + vertical direction length) exceeds the printable region in the vertical direction, the vertical direction length is set to (vertical direction printable region − vertical direction starting point).

● The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, the set printing region is not changed even if the basic calculated pitch is changed after setting the print region.

● If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

● The basic calculated pitch (x) is used in the calculated pitch for the horizontal direction starting point and the length in the horizontal direction; and the basic calculated pitch (y) is used in the calculated pitch for the vertical direction starting point and the length in the vertical direction.

● The print region shown in the figure below when the horizontal direction starting is X; the vertical direction starting point is Y; the horizontal direction length is Dx; and the vertical direction length is Dy.

Reference: CAN, ESC L, ESC T, GSP

(23)

● ESC \ nL nH   Specify relative position

Format: ASCⅡ   ESC   FF

              Decimal   27   92

              Hex   1B   5C

Range: $0 \leq nL \leq 255, 0 \leq nH \leq 255$

Description:

Specifies the next print starting position with a relative position based on the current position. This sets the position from the current position to [(nL + nH x 256) x basic calculated pitch] for the next print starting position.

Note:

● Specifications exceeding the print range are ignored.

● If the right direction of the current position is specified for the character direction, specify a positive number; if the left direction is specified, a negative number is used.

● Negative numbers is represented by the complement of 65536. For example, when moving in the left direction n pitches, use: $nL + nH \times 256 = 65536\text{-}N$

● The basic calculated pitch is set by GSP (basic calculated pitch setting).

● If there are fractions in the result, correct to the minimum mechanical pitch and discard.

● Use the basic calculated pitch (x) for the horizontal direction in standard mode.

● The following operations occur according to the starting point in page mode.

    a. If the starting point is set to upper left or lower right by the ESC T (Select character print direction in page mode) command, specify the relative position of the vertical direction in the paper feed. Use the basic calculated pitch (x) for the horizontal direction at this time.

    b. If the starting point is set to upper right or lower left by the ESC T (Select character print direction in page mode) command, move the print position in the paper feed direction. Use the basic calculated pitch (y) for the horizontal direction at this time.

Reference: ESC $, GS P

(24)

● ESC   a   Position alignment

Format: ASCII   ESC   a   n

                   Hex.   1B   61   n

                   Decimal   27   97   n

Range: $0 \leq n \leq 2, 48 \leq n \leq 50$

Default Value: n = 0

Description: Aligns all print data in one line to a specified position.

N	Position
0, 48	Left alignment
1, 49	Center
2, 50	Right alignment

Notes:

● This command is effective only when input at the top of the line when standard mode is being used.

● This command has no affect in page mode. In page mode, this command is only effective for the setting.

● Specifies the alignment position in the printing region that has been set.

- Portions skipped using command HT, ESC $ and ESC \ are also targeted for position alignment.

E.g.

Left alignment	Center	Right alignment
ABC ABCD ABCDE	ABC ABCD ABCDE	ABC ABCD ABCDE

(25)

- ESC d   Print and feed paper n lines

Format:	ASCII	ESC	d	n
	Hex.	1B	64	n
	Decimal	27	100	n

Range: $0 \leqslant n \leqslant 255$

Description: Prints the data in the print buffer and performs a paper feed of n lines.

Notes:

- Sets the print position to the beginning of the next line after printing.
- Line feeds set by command ESC 2 and ESC 3 are not affected.
- Paper is fed approximately 1016 mm (40 inc hes) if the [n x line feed amount] exceeds approximately 1016 mm (40 inches) .

Reference: ESC 2, ESC 3

(26)

- ESC   i   Execute partial-cut (one point left uncut)

Format:	ASCII	ESC	i	n
	Decimal	27	105	n
	Hex.	1B	69	n

Description: Execute a partial cut of the paper.

(27)

- ESC p m t1 t2   Specify cash drawer impulse

Format:	ASCII	ESC	p	m	t1	t2
	Hex	1B	70	m	t1	t2
	Decimal	27	112	m	t1	t2

Range: m = 0，48，1，49

$0 \leq t1 \leq 255$

$0 \leq t2 \leq 255$

- Drawer kick on time is set to [t1*2] millisecond; off time is set to [t2*2] millisecond.
- When t2 < t1, the value of t2 is processed as t2=t1..
- If t2 <50, its value is supposed to be 50.

(28)

- ESC t n   Select character code table

Format:	ASCII	ESC	t	n
	Hex	1B	74	n
	Decimal	27	116	n

Range: 0≤n≤255

Initial Value: n=0

Function: Select page n of the character code table.

n	Character Type
0	PC347(U.S.A)
3	PC860(Portuguese)
4	PC863(Canada-French)
5	PC865(Nordic)
7	(Spanish)
8	PC857(Turkey)
10	(Farsi)
14	PC864(Arabic)
18	PC852 (Latin2)
20	PC737(Greek)
22	PC864 (Arabic)
25	WPC1254(Turkey)
27	(Vietnam)
32	WPC1255(Israel)
33	Rumania
59	PC866 (Cyrillic #2)
61	PC857(Turkey)
68	(Armenia)

(29)

● ESC   v   Transmit paper sensor status

Format:	ASCII	ESC	v
	Decimal	27	118
	Hex	1B	76

ESC v transmits the status of a paper sensor as 1 byte of data. This command allows the host to obtain the near-end or paper-out status for each line. GS r 1 can also be used to check the status. GS r is recommended for transmitting the paper sensor status. The status to be transmitted is shown in the table below.

Bit	Off/On	Hex	Decimal	Status
0,1	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	03	3	Paper roll near-end sensor: paper near end.
	Off	00	0	Paper roll end sensor: paper present.
	On	(0C)	(12)	Paper roll end sensor: paper not present.
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

(30)

● ESC {   Turn upside-down printing mode on/off

Format:	ASCⅡ	ESC	{	n
	Decimal	27	123	n
	Hex	1B	7B	n

Range: 0≤n≤255

ESC { n turns upside-down printing mode on or off. When the LSB (least significant bit) of n is 1, upside-down printing mode is turned on; when it is 0, upside-down printing mode is turned off. The default setting is n=0. When upside-down mode is turned on, the printer prints 180°-rotated characters from right to left. The line printing order is not reversed; therefore, be careful of the order of the data transmitted. In standard mode, this command is enabled only when processed at the beginning of a line. In page mode, an internal flag is activated and this command is enabled when the printer returns to standard mode.

(31)

● FS ! n   Set Chinese characters printing mode compages

Format:	ASCII	FS	!	n
	Decimal	28	33	n
	Hex	1C	21	n

Range: 0≤n≤255

Set the parameter n of Chinese characters printing mode as follows:

Digit	0/1	Hex	Decimal	Function
0, 1		—	—	Undefined.
2	0	00	0	Double-width mode not selected.
	1	04	4	Double-width mode selected.
3	0	00	0	Double-height mode not selected.
	1	08	8	Double-height mode selected.
4-6		--	--	Undefined.
7	0	00	0	Underline not selected.
	1	128	80	Underline selected.

(32)

● FS S n1 n2   Set Chinese character space amount

Format:	ASCII	FS	S	n1	n2
	Decimal	28	83	n1	n2
	Hex	1C	53	n1	n2

Range: 0≤n1≤255, 0≤n2≤255

Initial value: n1=0, n2=0

Description: 1. Sets the Chinese character space amount and right space amount.

2. Left space amount: n1 x (basic calculated pitch)

3. Right space amount: n2 x (basic calculated pitch)

Note:

● The space amount set by this command is the amount when using standard sized characters. When expanding characters more than double in the horizontal direction, the space amount is [set amount x horizontal direction magnification].

● Space amount can be set independently for both the standard and page modes.

● The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the Chinese character space amount, it is not affected even if the basic calculated pitch is changed.

● If there are fractions in the result, correct to the minimum mechanical pitch and discard.

● Use the basic calculated pitch (x) for the horizontal direction in standard mode.

● In page mode, the basic calculated pitch that is used according to the starting point is shown below.

a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.

b. When the starting point is specified to be upper right or lower left by the ESC T command, the basic calculated pitch (y) for the vertical direction is used.

c. The maximum value for the left or right space for Chinese characters is approximately 35.893 mm (255/180 inches). Specifications that exceed the maximum value are rounded off to that value.

Reference: GSP

(33)

- FS p n m   Print the bit image that download to flash

Format	ASCII	FS	p	n	m
	Hex	1C	70	n	m
	Decimal	28	112	n	m

Range: $1 \leq n \leq 255$, $0 \leq m \leq 3$, $48 \leq m \leq 51$

Description: Using mode m to print bit image that download to flash.

m	Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	180DPI	180 DPI
1, 49	Double-wide Mode	180DPI	90 DPI
2, 50	Double-tall Mode	90 DPI	180 DPI
3, 51	Quadruple Mode	90 DPI	90 DPI

n specifies the bit image(defined by command FS q) number.

m specifies the bit-image mode.

Details:

✧ Flash bit image is a bit image defined in flash memory by FS q and printed by this command.

✧ This command is ignored when the bit image is undefined.

✧ This command is effective only when no data exists in the print buffer in standard mode.

✧ Excluding upside-down printing, print modes (emphasized printing, double printing, double wide, double tall, underlines, character sizes, black/white inverted printing and 90 degree clockwise rotation) are unaffected.

✧ If bit image specification is of a size that exceeds the print region, the data in the print region is targeted for printing, but the excessive data is not printed.

✧ This command feeds dots (for the height *n* of the NV bit image) in normal and double-width modes,

✧ and (for the height of the NV bit image n x 2) in double-height and quadruple modes, regardless of

✧ the line spacing specified by ESC 2 or ESC 3.

✧ After printing the bit image, this command sets the print line feed and processes the subsequent data as normal data.

Reference: ESC *, FS q, GS /, GS v 0

(34)

- **FS q n [xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk] n   Define NV bit image**

Format	ASCII	FS	q	n	[xLxHyLyHd1...dk]1 ... [xLxHyLyHd1...dk] n
	Hex	1C	71	n	[xLxHyLyHd1...dk]1 ... [xLxHyLyHd1...dk] n
	Decimal	28	113	n	[xLxHyLyHd1...dk]1 ... [xLxHyLyHd1...dk] n

Range:

   $1 \leq n \leq 255$

   $0 \leq xL \leq 255$

$1 \le (xL+xH\times256) \le 1023$

$1 \le (yL+yH\times256) \le 288$

$0 \le d \le 255$

$k = (xL+xH\times256) \times (yL+yH\times256) \times 8$

The maximum capacity that downloads to NV is 8096 bytes.

Descriptions: Defines the specified flash bit image.

✧　n specifies the number of NV bit images to define.

✧　xL and xH specify the horizontal direction for one NV bit image (xL + xH x 256) x 8 dots.

✧　yL and yH specify the vertical direction for one NV bit image (yL + yH x 256) x 8 dots.

Notes:

● There is the potential of damaging the non-volatile memory by overusing the command, so only use this command once a day to write to the non-volatile memory.

● This command erases all previously defined NV bit images. The printer cannot redefine only one of several data definitions that had been defined before. Therefore, all data must be resent.

● The printer may enter a BUSY state while writing data to the non-volatile memory when using this command. While the printer is BUSY, the printer will stop receptions so data will not be received from the host (including real-time commands).

● NV bit image is a bit image defined by this command in non-volatile memory and is printed by the FS p (Print NV bit image) command.

● This command is effective only when processed at the top of the line when standard mode is being used.

● This command is effective when 7 bytes of FS to yH of the command are processed normally.

● When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH, the printer only processes the data in the defined range.

● This command is invalid when processing an argument that is out of the defined range with the initial NV bit image data.

● The printer terminates processing of this command and starts writing data to the non-volatile memory if an argument out of the defined range is processed on the second and subsequent NV bit image data. This invalidates the NV bit image being defined (making it undefined), but the NV bit images prior to that are valid.

● d specifies defined data. Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.

● An n number of NV bit images are defined in ascending order from 01H. Therefore, The first data of [xLxHyLyHd1.dk] is an NV bit image of the number 01H. The final data of [xLxHyLyHd1.dk] is the NV bit image of the number n. This matches with the NV bit image number that is specified for NV bit image printing (by FS p).

● One NV bit image definition data is configured by [xL xH yL yH d1.dk]. Therefore, if defining only one NV bit image data, n = 1. The data of [xL xH yL yH d1.dk] is processed only once. This uses ([data: (xL + xH x 256) x (yL + yH x 256) x 8] + [Data: 4]) of non-volatile memory.

● The printer is in a BUSY state just prior to writing to the non-volatile memory.

● The sending of ASB status and detection of status are not possible while processing this command even when the ASB function is specified.

● When processing this command while defining a macro, the macro definition is terminated and the command commences with processing.

● NV bit images that have been defined are not initialized by the ESC @ (Initialize printer), a reset or by turning off the printer's power.

● This command only defines the NV bit image, but it does not print it. To print an NV bit image, use FS p

(Print NV bit image).

Reference: FS p

Ex.: **For xL=64, xH=0, yL=96, yH=0**

$(xL + xH \times 256) \times 8$ dots =512 dots

$(yL + yH \times 256) \times 8$ dots =768 dots
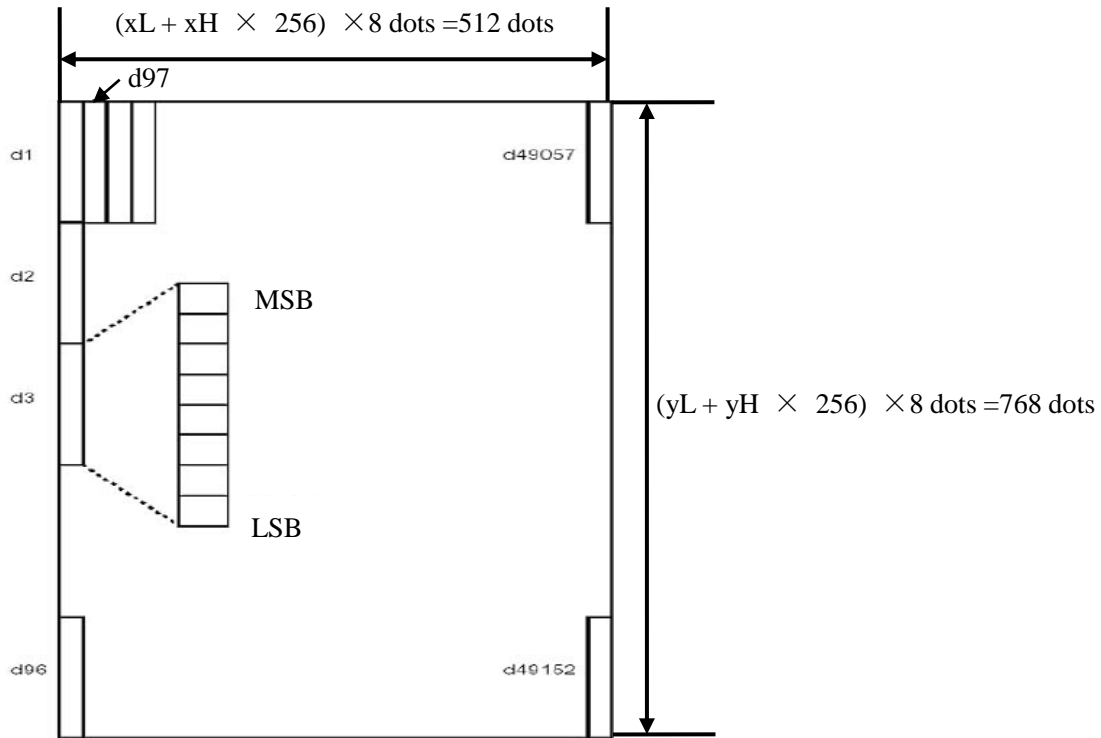
(35)

- **GS ! n   Select character size**

Format: ASCII   GS   !   n

          Hex   1D   21   n

          Decimal   29   33   n

Range: $0 \leqslant n \leqslant 255$

GS ! n selects the character height using bits 0 to 3, and selects the character width using bits 4 to 7.

Character width selection is as follows:

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double-width)

Character height selection is as follows:

Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (double-width)
02	2	3
03	3	4
04	4	5
05	5	6
06	6	7
07	7	8

Note:

- This command is effective for all characters (ANK and Chinese characters), excluding HRI characters.
- If the vertical and horizontal magnification ratios are outside the defined range, this command is ignored.
- In standard mode, the vertical direction is the paper feed direction; the horizontal direction traverses the paper feed direction. Therefore, when character orientation changes in 90 degree clockwise rotation mode, the relationship between vertical and horizontal directions is reversed.
- In page mode, vertical and horizontal directions are based on the character orientation.
- The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- The ESC ! (Batch specify print mode) command can also turn double-width and double-height modes on or off, but the setting of the last received command is effective.

Reference: ESC !

(36)

- GS $ nL nH   Specify absolute position for character vertical direction in page mode

Format:	ASCII	GS	!	nL	nH
	Hex	1D	24	nL	nH
	Decimal	29	36	nL	nH

Range: $0 \leqslant nL \leqslant 255, 0 \leqslant nH \leqslant 255$

Description:

Specifies the character vertical direction position for the data expansion starting position using the absolute position based on the starting point in page mode. The position of the character vertical direction for the next data expansion starting position is the position specified by [(nL + nH x 256) x basic calculated pitch] from the starting point.

Note:

- When not in page mode, this command is ignored.
- Specifications for absolute positions that exceed the specified print range are ignored.
- The position of the character horizontal direction of the data expansion starting position does not move.
- The starting point that is used as a reference is specified by ESC T.
- The following operations occur depending on the starting point of (Selecting the character printing direction in page mode) ESC T.
  a. If the starting point is upper left or lower right, specify the absolution position for the paper feed direction (character vertical direction). Use the basic calculated pitch (y) for the horizontal direction at this time.
  b. If the starting point is upper right or lower left, specify the absolution position for the paper feed in the vertical direction (character vertical direction). Use the basic calculated pitch (x) for the horizontal direction at this time.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC $, ESC T, ESC W, ESC \, GS P, GS\

(37)

- GS   H   n   Select printing position of HRI characters

Format:	ASCII	GS	H	n
	Hex	1D	48	n
	Decimal	29	72	n

Range: 0≤n≤3
          48≤n≤51

GS H n selects the printing position for HRI characters when printing a bar code. n selects the printing position as follows:

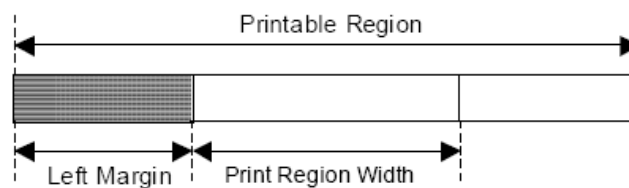The default setting is n=0. HRI characters are printed at the position specified by GS H.

(38)

● GS L nL nH   Set left margin

Format: ASCII   GS   L   nL   nH
           Hex   1D   4C   nL   nH
           Decimal 29   76   nL   nH

Range: 0≤ nL ≤ 255, 0≤ nH ≤ 255

Description:

1. nL and nH set the specified left margin.

2. The left margin is [(nL + nH x 256) x basic calculated pitch]

Note:

● This command is effective only when input at the top of the line when standard mode is being used.

● This command has no affect in page mode. This command is only effective for the setting.

● The maximum setting for the left margin is the same size as the printable region for the horizontal direction. Specifications that exceed the maximum value are rounded off to that value.

● The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the left margin, it is not affected even if the basic calculated pitch is changed.

● Use the basic calculated pitch (x) for the horizontal direction of GS P (Set basic calculated pitch) to calculate the left margin. If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: GS P, GS W

(39)

● **GS P x y**   Set basic calculated pitch

Format: ASCII   GS   P   x   y

Hex   1D   50   x   y

Decimal   29   80   x   y

Range: 0≤x≤255, 0≤y≤255

Initial value: x = 180, y = 360: EPSON targeted model print head 180 DPI

x = 203, y = 203: EPSON targeted model print head 203 DPI

Description:

Sets the horizontal basic calculated pitch to approximately 25.4/xmm [(1/x) inch], and the vertical basic calculated pitch to approximately 25.4/ymm [(1/y) inch].

x = 0: Returns the horizontal basic calculated pitch to its default value.

y = 0: Returns the vertical basic calculated pitch to its default value.

Note:

● Horizontal direction refers to the vertical direction in reference to paper feed; Vertical direction refers to the direction of paper feed.

● With standard mode, use the parameters shown below regardless of the direction of the characters (upside down, or rotated 90 degrees).

a. Commands using x: ESC SP, ESC $, ESC \, FSS, GSL, GSW

b. Commands using y: ESC 3, ESC J, GSV

● With page mode, use the parameters shown below according to the direction of the characters.

a. If the starting point is upper left or lower right using ESC T (Character print direction selection in page mode) (feeds paper and expands characters in the vertical direction):

Commands using x: ESC SP, ESC $, ESCW, ESC \, FSS

Commands using y: ESC3, ESCJ, ESCW, GS$, GS\, GSV

b. If the starting point is upper right or lower left using ESC T (Character print direction selection in page mode) (expands characters in the paper feed direction):

Commands using x: ESC 3, ESC J, ESCW, GS $, GS \

Commands using y: ESC SP, ESC $, ESCW, ESC \, FSS, GSV

● This command has no affect on any previously set setting values.

● If the calculation combining other commands results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC SP, ESC $, ESC 3, ESC J, ESC W, ESC \, GS $, GS L, GS V, GS W, GS \

(40)

● **①GS V m ②GS V m n**   Select paper-cut mode and cutting paper

Format: ①ASCII   GS   V   m

Hex   1D   56   m

Decimal   29   86   m

②ASCII   GS   V   m   n

Hex   1D   56   m   n

Decimal   29   86   m   n

Range: ① m = 0，48，1，49

② m = 65，66，   0 ≤n ≤255

Paper-cut

M	Paper-cut mode
0, 48	Full-cut
1, 49	Partial-cut
65,66	Feed paper ([n* (lengthways moving unit) inch]) and partial-cut

- m = 0, 48, 1, 49, cutting paper directly.
- m= 65, 66, feeding paper [the distance between printing position and the paper cutter + n*(lengthways moving unit)], and then cutting paper.
- Measuring the formfeed distance by lengthways moving unit

(41)

- GS \ nL nH   Specify relative position for character vertical direction in page mode

    Format: ASCII   GS   \   nL   nH

    Hex   1D   5C   nL   nH

    Decimal   29   92   nL   nH

    Range: $0 \leqslant nL \leqslant 255, 0 \leqslant nH \leqslant 255$

    Description:

    Specifies the character vertical direction position for the data expansion starting position using the relative position based on the current point in page mode. This sets the position moved from the current position to [(nL + nH x 256) x basic calculated pitch] for the next data expanding starting position.

    Note:

- When not in page mode, this command is ignored.
- If the direction below the current position is specified for the characters, specify a positive number; if the direction above is specified, a negative number is used.
- Negative numbers are represented by the complement of 65536. For example, when moving in the upward direction N pitches, use: $nL + nH \times 256 = 65536{-}N$
- Specifications for relative positions that exceed the specified print region are ignored.
- The following operations occur depending on ESC T (Selecting the character printing direction in page mode).

    a. If the starting point is upper left or lower right, specify the relative position for the paper feed direction. Use the basic calculated pitch (y) for the horizontal direction at this time.

    b. If the starting point is upper right or lower left, specify the relative position for the paper feed in the vertical direction. Use the basic calculated pitch (x) for the horizontal direction at this time.

- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC $, ESC T, ESC W, ESC \, GS $, GS P

(42)

- GS h n   Set bar code height

    Format: ASCII   GS   h   n

    Hex   1D   68   n

    Decimal   29   104   n

    Range: $1 \leqslant n \leqslant 255$

    GS h n selects the height of a bar code. n specifies the number of dots in the vertical direction. One dot corresponds to 1/180 inch. The default setting is n=162.

```
                        Program Example
 PRINT #1,CHR$(&H1D);"h";CHR$(50);Set height to 50
    PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
    PRINT #1,"496595707379";CHR$(0);
    PRINT #1,CHR$(&HA);
 PRINT #1,CHR$(&H1D);"h";CHR$(100);Set height to 100
    PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
    PRINT #1,"496595707379";CHR$(0);
    PRINT #1,CHR$(&HA);
```

Print Sample

Height: 50 dots

Height: 100 dots

---

(43)

● **GS k m d1 ... dk NUL   GS k m n d1 ... dn**   Print bar code

Format:	①ASCII	GS	k	m d1 ... dk NUL
	Hex	1D	6B	m d1 ... dk 00
	Decimal	29	107	m d1 ... dk 0
	②ASCII	GS	k	m n d1 ... dn
	Hex	1D	6B	m n d1 ... dn
	Decimal	29	107	m n d1 ... dn

Range:　①0≤m≤6 (k and d depend on the bar code system used)

　　　　②65≤m≤73 (n and d depend on the bar code system used)

①GS k m d1 ... dk NUL and ②GS k m n d1 ... dn select a bar code system and print the bar code.

m specifies a bar code system as follows:

m		Bar Code System	Number of Characters	Remarks
①	0	UPC-A	$11 \le k \le 12$	$48 \le d \le 57$
	1	UPC-E	$11 \le k \le 12$	$48 \le d \le 57$
	2	JAN13 (EAN13)	$12 \le k \le 13$	$48 \le d \le 57$
	3	JAN8 (EAN8)	$7 \le k \le 8$	$48 \le d \le 57$
	4	CODE39	$1 \le k$	$48 \le d \le 57,\ 65 \le d \le 90$, $d = 32, 36, 37, 43, 45, 46, 47$
	5	ITF	$1 \le k$ (even number)	$48 \le d \le 57$
	6	CODABAR	$1 \le k$	$48 \le d \le 57,\ 65 \le d \le 68$, $d = 36, 43, 45, 46, 47, 58$
②	65	UPC-A	$11 \le n \le 12$	$48 \le d \le 57$
	66	UPC-E	$11 \le n \le 12$	$48 \le d \le 57$
	67	JAN13 (EAN13)	$12 \le n \le 13$	$48 \le d \le 57$
	68	JAN8 (EAN8)	$7 \le n \le 8$	$48 \le d \le 57$
	69	CODE39	$1 \le n \le 255$	$48 \le d \le 57,\ 65 \le d \le 90$, $d = 32, 36, 37, 43, 45, 46, 47$
	70	ITF	$1 \le n \le 255$ (even number)	$48 \le d \le 57$
	71	CODABAR	$1 \le n \le 255$	$48 \le d \le 57,\ 65 \le d \le 68$, $d = 36, 43, 45, 46, 47, 58$
	72	CODE93	$1 \le n \le 255$	$0 \le d \le 127$
	73	CODE128	$2 \le n \le 255$	$0 \le d \le 127$

Note:

For ①

- This command is quit by the NULL code.
- For UPC-A and UPC-E, a bar code is printed when 12 bytes of bar code data are input. Subsequent data is processed as normal data.
- For JAN13 (EAN13), a bar code is printed when 13 bytes of bar code data are input. Subsequent data is processed as normal data.
- For JAN8 (EAN8), a bar code is printed when 8 bytes of bar code data are input. Subsequent data is processed as normal data.
- The data count for ITF bar codes is always even numbered. If the data count is odd numbered, the last data is ignored.

For ②:

- n specifies the data count. n bytes from the next data is processed as bar code data.
- If n is outside of the defined region, the command is stopped and normal printing commences from subsequent data.

When in standard mode:

- If d is outside of the defined region, only a paper feed is executed and normal printing commences from subsequent data.
- If the horizontal width of the bar code exceeds the print region of one line, the paper is fed without printing the bar code.
- Executes a paper feed for the height of the bar code (including HRI characters when HRI character printing is specified) regardless of the line feed amount using the following commands.
  a. ESC 2: Set default line spacing
  b. ESC 3: Set line feed amount
- This command is effective only when no data exists in the print buffer. If there is data in the print buffer, data after m is printed as normal data. Sets the next print position to the beginning of the next line after printing the bar code.
- Excluding upside-down printing, print modes (emphasized printing, double printing, underlines character sizes) are unaffected.

When in page mode:

- Executes only a bar code expansion but does not print it. After expanding the bar code, the next dot after the last data of the bar code is the starting position for the expansion of subsequent data.
- If d is outside of the defined region, the command is stopped and normal printing commences from subsequent data. The position for starting data expansion does not move.
- If the horizontal width of the bar code exceeds the print region of one line, the data expansion starting position is moved to the left side outside the printing region without printing the bar code.

```
Program Example
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1, CHR$(&HA);
PRINT #1, CHR$(&H1D); "k";CHR$(67); CHR$(12);
PRINT #1,"496595707379"; Print bar code
```

Print Sample
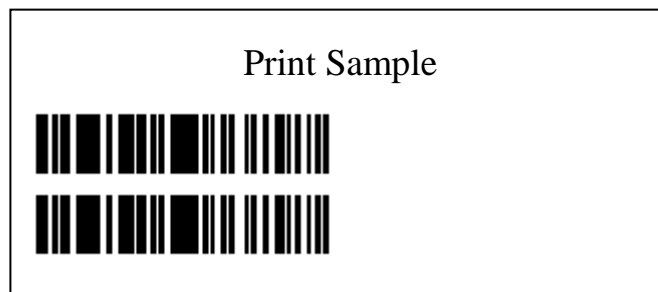
Reference: GS H, GS f, GS h, GS w

(44)

- GS   v   0   m   xL   xH   yL   yH   d1...dk   Print raster graphic

  Format: ASCII   GS   v   0   m   xL   xH   yL   yH   d1...dk

  Hex   1D   76   30   m   xL   xH   yL   yH   d1...dk

  Decimal   29   118   48   m   xL   xH   yL   yH   d1...dk

  Range: m=0

  $0 \leq xL \leq 27$

  xH=0

  yL=24

  yH=0

  $0 \leq d \leq 5$

  $k = (xL + xH \times 256) \times (yL + yH \times 256) (k \neq 0)$

✧   xL and xH specify the horizontal direction data count for one bit image (xL + xH x 256) in bytes.

✧   yL and yH specify the vertical direction data count for one bit image (yL + yH x 256) in bytes.

E.g. when $xL + xH \times 256 = 64$

$(xL + xH \times 256) \times 8dot = 512 \, dot$

1	2	3	……	62	63	64
65	66	67	……	126	127	128
			……			
			……	K–2	K–1	K

$(yL + yH \times 256) \, dot$

7	6	5	4	3	2	1	0

most significant bit   least significant bit

(45)

- GS w n   Set bar code width

Format:	ASCII	GS	w	n
	Hex	1D	77	n
	Decimal	29	119	n

Range: 2≤n≤6

GS w n selects the horizontal size of a bar code. n specifies the bar code width as shown below. The multilevel bar codes are UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, and CODE128. The binary level bar codes are CODE39, ITF, and CODABAR. The default setting is n=3.

n	Module Width (mm) for Multilevel Bar Code	Binary Level Bar Code	
		Thin Element Width (mm)	Thick Element Width (mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

```
Program Example
PRINT #1,CHR$(&H1D);"w";CHR$(3);Set width size to 3
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
PRINT #1,CHR$(&H1D);"w";CHR$(4);Set width size to 4
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
PRINT #1,CHR$(&H1D);"w";CHR$(5);Set width size to 5
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
```

Print Sample

Width size 3

Width size 4

Width size 5

2 COMMAND SAMPLE (hex command)

1d 68 64 1d 6b 02 34 39 36 35 39 35 37 30 37 33 37 39 00 0a

    //print a barcode width 1, height 100

1d 77 02 1d 6b 02 34 39 36 35 39 35 37 30 37 33 37 39 00 0a

    // print a barcode width 2, height 100

1d 77 02 1d 6b 02 32 32 30 30 30 30 32 30 30 30 35 30 35 00 0a

     // print EAN-13 barcode

1d 6b 00 30 30 30 30 30 30 30 30 30 30 30 00 0a

     //print UPC-A barcode

1d 6b 03 30 30 30 30 30 30 30 30 00 0a

     //print EAN-8 barcode

1d 6b 04 30 30 30 30 30 30 30 30 30 30 30 30 30 00 0a

     // CODE39

1d 68 64 1d 48 03 1d 6b 04 30 30 30 30 30 30 30 30 30 30 30 30 30 00 0a

    //set the position of digits on the barcode

Revision：01